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Publication number:

**0 431 338 A3**

(12)

## EUROPEAN PATENT APPLICATION

(21) Application number: 90121374.4

(51) Int. Cl.<sup>5</sup>: **B41J 2/16**

(22) Date of filing: 08.11.90

(30) Priority: 09.11.89 JP 292899/89

(43) Date of publication of application:  
12.06.91 Bulletin 91/24

(84) Designated Contracting States:  
**DE FR GB**

(89) Date of deferred publication of the search report:  
30.10.91 Bulletin 91/44

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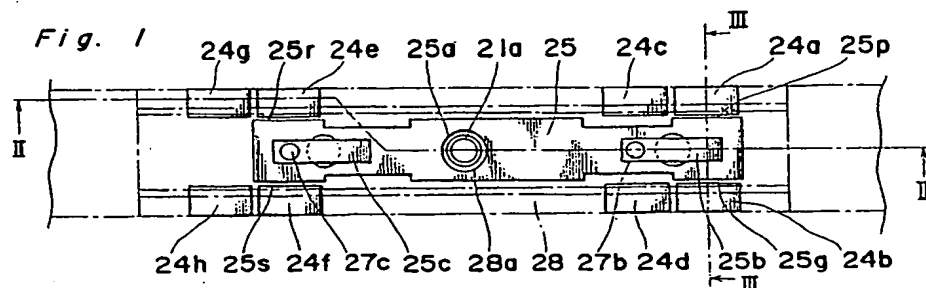
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(54) Ink recording apparatus.

(57) An ink recording apparatus used with printers or the like and manufactured by applying semiconductor device manufacturing techniques. One wall of an ink chamber (20) is formed of a single-crystal substrate (21) and an ink jet port (21a) is formed by etching on the single-crystal substrate (21). The ink chamber (20) has a pressure-applying unit (60) therein, and the pressure is applied to ink within the ink chamber (20) so that the ink is jetted through the ink jet port (21a). The pressure-applying unit (60) has piezoelectric elements (60a). A shutter (25) and electrodes (24a to 24h) composed of polycrystalline-silicon film are formed on the single-crystal substrate

by film forming in the LPCVD method and patterning through plasma etching. A front wall (28) is formed by coating the shutter (25) and electrodes (24a to 24h) further with a polycrystalline-silicon film. The shutter (25) is movable between the wall surface of the ink chamber (20) and the front wall (28), being driven through electrostatic attracting force produced between voltage-applied electrodes (24a to 24h) and the shutter (25). The electrodes (24a to 24h) are formed at positions corresponding to those where the shutter (25) blocks the ink jet port (21a) and releases the same.



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## EUROPEAN SEARCH REPORT

Application Number

EP-90-12-1374

### DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
E	EP-A-0 417 673 (MATSUSHITA ELECTRIC INDUSTRIAL COMPANY LTD.) * abstract; figures 1-6, 8, 9 ** column 4, line 35 - column 6, line 56 ** column 9, lines 13 - 18 * - - -	1,2,5,7,8	B 41 J 2/16
X,A	US-A-4 199 767 (CAMPBELL ET AL) * abstract; figures ** column 3, line 31 - column 5, line 60 * - - -	1,7,8	
A	IBM TECHNICAL DISCLOSURE BULLETIN. vol. 22, no. 3, August 1979, NEW YORK US pages 917 - 918; Lammers G.B.: "Multi-nozzle Segmented Slider Valve" * the whole document * - - -	1	
A	PATENT ABSTRACTS OF JAPAN vol. 11, no. 318 (M-632)(2765) 16 October 1987, & JP-A-62 101445 (HIROSHI ENDO) 11 May 1987, * the whole document * - - - - -	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 41 J
Place of search	Date of completion of search	Examiner	
The Hague	29 August 91	ROBERTS N.	
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